REMARKS

In response to the above Office Action and the rejection of claims 6, 9 and 10 under § 112, second paragraph for being indefinite, claim 6 has been amended to make it clear that the metal plating having a thickness of at least 10 μm is a single layer coating.

On the other hand, claims 9 and 10 depend from claim 7, which recites that the metal plating includes an electroless plating base layer and an electroplating tip layer. In other words, a two layer coating. Claim 9 defines the thickness of the lower layer and claim 10 the thickness of the top layer. It should be further noted that claim 7 depends from claim 3, not claim 6, so that the thicknesses of claims 9 and 10, even together, are not inconsistent with claim 6.

Withdrawal of the rejection of claims 6, 9 and 10 under § 112 is therefore requested.

Claims 1, 2, 12, 13, 15, 16, 18, 23, and 25 have been amended merely for clarity and to place the claims in more conventional U.S. format. None of these amendments or that to claim 6 have been made in view of the cited prior art.

In the Office Action, the Examiner rejected claims 1-5, 7, 8, 11, 13, 15, 17-23, 25, 26, and 28 under § 103 for being obvious over Takagi et al. in view of Teshima et al. and Zolla; claims 14, 24, and 27 further in view of Sato; and claims 6, 9, and 10 further in view of the ordinary skill in the art. The indicated allowance of the subject matter of claims 12 and 16 is appreciated. However, it is believed the subject matter of at least independent claims 1, 23, and 26 patentably distinguish the invention from the prior art without the necessity of limiting them to the subject matter of the allowed claims for the following reasons.

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The present invention as defined in the main claims, relates to a rotor for an electric motor or a method for making the rotor in which the rotor comprises a magnet having a rotation axis and a shaft fixed concentrically in a through hole in the magnet. The shaft has a first portion fitted in the through hole that has an axial interengagement length in engagement with an inside surface of the through hole that is "shorter than an axial length of said through hole," and a second portion that is not in engagement with an inside surface of the through hole. This axial interengagement length of the first portion is represented, for example, by the distance t, t_2, t_3, or t_4 in Figs. 2, 3, 5, and 6, respectively, the corresponding and longer axial length of the through hole being T_1, T_2, T_3, or T_4.

The reference to Takagi et al. (USP 6,081,056) shows a conventional rotor 14 having a shaft 15, a yoke 16 fitted to the shaft 15, and permanent magnets 17 embedded in the yoke 16. The shaft 15 is fitted into the center of the yoke 16 (column 11, lines 61 to 62). However, Fig. 1 clearly shows that the shaft 15 is engaged with the yoke 16 over the entire axial length of the center through hole of the yoke 16. This construction is clearly different from the present invention wherein the shaft includes a first portion fitted in the through hole of the magnet, that has an axial interengagement length with an inside surface of the through hole shorter than the axial length of the through hole.

The Examiner also stated that the rotor of the reference includes "reinforcing means" in the hole for ensuring a fixing force to hold the shaft, without clarifying which component in the rotor he regards to be the reinforcing means. In fact, the reference does not appear to teach any such reinforcing means. Thus the construction of the

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rotor of the present invention, as defined in claim 1, or the method of claim 23 which includes a coating on an inside surface of the hole or of claim 26 which includes an adhesive in a clearance inside the hole, both of which function as the reinforcing means is clearly different from Takagi et al. for this additional reason.

Regarding the secondary references, neither Teshima et al. nor Zolla were cited for and, in fact, do not show either of these two features. As set forth in M.P.E.P. § 2143, to establish a prima facie case of obviousness, one of the requirements is that the prior art references relied on must show, at least in combination, all of the claim limitations. Since neither 1) the claimed first portion of the shaft having an axial interengagement length in engagement with an inside surface of the through hole of a magnet that is shorter than the axial length of the through hole of the magnet or 2) the claimed reinforcing means for securely fixing the shaft to the magnet is shown in any of the three cited references, it is not seen how the claimed invention can be considered obvious over these references. Reconsideration and withdrawal of the rejection of the noted claims based on Takagi et al., Teshima et al., and Zolla is therefore requested.

Teshima et al. may show an electroless plating similar to that described in some of the dependent claims for the purpose of preventing rust, but it is not seen where the reference teaches, as set forth in some of the claims, that this plating is provided on an inside surface of the through hole of a magnet or functions as a reinforcing means for securing a shaft in the magnet as claimed.

Similarly, Zolla may show more detailed electroless plating layers, but again the reference does not teach the claimed location of the layer or its claimed function.

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Regarding the rejections of claims 6, 9, 10, 14, 24, and 27 over further prior art, it is noted that these claims all depend from one of independent claims 1, 23, or 26. Accordingly, these claims patentably distinguish over the cited prior art for the same reasons set forth above with respect to the independent claims.

It is believed claims 1-28 are in condition for allowance and such action is therefore requested.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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Dated: November 9, 2001

By: ______________________
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APPENDIX TO AMENDMENT OF NOVEMBER 9, 2001

Version with Markings to Show Changes Made

Amendments to the Claims

1. (Amended) A rotor for an electric motor, comprising:

a magnet having a rotation axis, said magnet being provided with a through hole extending coaxially with said rotation axis;

a shaft fixed concentrically to said magnet, said shaft including a first portion fitted in said through hole, said first portion having an axial interengagement length that is in engagement with an inside surface of said through hole and is shorter than an axial length of said through hole and a second portion that is not in engagement with an inside surface of said through hole; and

reinforcing means provided at least inside said through hole for [ensuring a fixing force to] securely fixing [hold] said shaft in a predetermined position in said magnet.

2. (Amended) A rotor as set forth in claim 1, wherein said magnet comprises an annular magnet material and said reinforcing means comprises a coating formed at least on [a] an inside surface of the through hole of said magnet material [at least inside said through hole, and wherein said reinforcing means comprises said coating], said axial interengagement length of said first portion of said shaft being engaged with said coating in a face-to-face manner.

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6. (Amended) A rotor as set forth in claim 3, wherein said metal plating [has] is a single layer coating having a thickness of at least 10 μm.

12. (Amended) A rotor as set forth in claim 11, wherein a dimensional relationship between said axial interengagement length of said first portion of said shaft and said axial length of said through hole is defined as $T/5 \leq t \leq T/2$, in which "T" is said through hole axial length and "t" is said axial interengagement length.

13. (Amended) A rotor as set forth in claim 11, wherein said first portion of said shaft is tightly press-fitted in said through hole of said magnet, and wherein an interference of said first portion in said through hole is in a range of 5 μm to 30 μm.

15. (Amended) A rotor as set forth in claim 1, wherein said reinforcing means comprises an adhesive filled in a clearance defined between [a reminder] said second portion of said shaft [other than said portion] and an inside surface of said through hole of said magnet [inside said through hole].

16. (Amended) A rotor as set forth in claim 15, wherein a dimensional relationship between said axial interengagement length of said first portion of said shaft and said axial length of said through hole is defined as $T/5 \leq t \leq 4T/5$, in which "T" is said through hole axial length and "t" is said axial interengagement length.

18. (Amended) A rotor as set forth in claim 15, wherein said magnet comprises an annular magnet material and said reinforcing means further comprises a coating formed at least on [a] an inside surface of the through hole of said magnet material [at least inside said through hole, and wherein said reinforcing means further comprises said coating], said axial interengagement length of said first portion of said shaft being engaged with said coating in a face-to-face manner.

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23. (Amended) [Method] A method of producing a rotor for an electric motor, comprising the steps of:

forming a coating on [a] at least an inside surface of a through hole of an annular magnet material [and thereby providing a magnet] having a rotation axis [and a] , said through hole extending coaxially with said rotation axis[, said coating being arranged at least inside said through hole];

providing a shaft including a first portion capable of being fitted in said through hole; and

inserting said first portion of said shaft into said through hole of said magnet [and tightly press-fitting said portion of said shaft in said through hole,] until an axial interengagement length of said first portion, shorter than an axial length of said through hole, is [obtained] engaged in a tightly press-fit manner with said coating while a second portion of said shaft is not in engagement with said coating.

25. (Amended) A method as set forth in claim 23, wherein an interference of said first portion in said through hole is adjusted by changing a thickness of said coating.

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